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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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**WATER DISPOSAL SYSTEM, METHOD OF DISPOSING WATER,
AND POWER GENERATION APPARATUS**

Detailed Action

1. The amendments filed on December 18, 2009 were received. Applicant has amended claims 47, 58, 78, and 80; and, cancelled claims 83, 85 and 86. Currently, claims 47-51, 53, 54, 55, 58, 59, 60, 78, 80, 81, 82, 84, and 87-92 are pending.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

3. The rejection of claims 47-51, 53, 54, 55, 58, 59, 60, 78 and 80-92 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, is withdrawn because claims 47, 58, 78 and 80 were amended; and, claims 83, 85 and 86 were cancelled.

4. The rejection of claims 47-51, 53, 54, 55, 58, 59 and 60 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement, is maintained.

Regarding claims 47-51, 53, 54, 55, 58, 59 and 60, claims 47 and 58 recite "... surface area of the water-absorbing member is larger than a surface area of the power generator." However, the portion of the specification now cited as support for this portion of the claim (i.e., see p. 22, lines 24-30 of the instant specification that appears to correlate to that cited by applicant) does not appear to support applicant's contention that the water-absorbing member is larger than the power generation apparatus. The specification states that the water-absorbing member will have a "larger surface area". The cited

Art Unit: 1795

portion of the specification does not state that this "larger surface area" is greater than that of the power generation apparatus nor does its Fig. 2, also cited by applicant, allow the relative dimensions of the water-absorbing member with respect to the power generation apparatus to be ascertained.

5. The rejection of claim 84 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 84, the claim recites the limitation "... according to claim 83, ...". There is insufficient antecedent basis for this limitation in the claim (i.e., claim 83 was cancelled). (*Examiner's Note*: For purposes of examination, it is assumed that this phrase recites "... according to claim 78, ...".)

Claim Rejections - 35 USC § 103

6. The rejection of claims 78, 80, 81, 83, 84 and 88-92 under 35 U.S.C. 103(a) as being unpatentable over Sakakibara et al. (JP 02-168565; refer to translation) in view of Streckert et al. (US 6,447,945) is withdrawn because claims 78 and 80 were amended.

The rejection of claims 85 and 86 under 35 U.S.C. 103(a) as being unpatentable over Sakakibara et al. and Streckert et al., and further in view of Chizawa et al., is withdrawn because claims 85 and 86 were cancelled.

7. Claims 78, 80, 81, 84 and 88-92 under 35 U.S.C. 103(a) as being unpatentable over Sakakibara et al. (JP 02-168565; refer to translation) in view of Chizawa et al. (US 6,613,467).

Regarding claim 78, if the body of a claim fully and intrinsically sets forth all of the limitations of the claimed invention, and the preamble merely states, for example, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the

Art Unit: 1795

preamble is not considered a limitation and is of no significance to claim construction (e.g., *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999); *Rowe v. Dror*, 112 F.3d 473, 478, 42 USPQ2d 1550, 1553 (Fed. Cir. 1997)). See MPEP 2111.02 (II).

Sakakibara also teaches a power generation apparatus for generating electric power [fuel cell] by supplying a fuel gas and an oxidizer gas such that the fuel gas and the oxidizer gas can electrochemically react with each other (claim 1), comprising:

- a power generator [fuel cell] having a predetermined electrolyte film [3] provided between a first electrode [1] and a second electrode [2] (Figs. 2(A), 2(B); p. 9, para. 5);
- a separator [10] having, formed thereon, a fuel supply groove [11] for supplying the fuel gas to the first electrode and an oxidizer supply groove [12] for supplying the oxidizer gas to the second electrode, and for holding the power generator (p. 9, para. 5); and
- a water-absorbing member [13] for absorbing water generated during power generation by the power generator, provided at least on a midway portion of the oxidizer supply groove (Fig. 2(B); p. 6, para. 2; p. 7, para. 5 – p. 8, para. 1).

Sakakibara does not expressly teach that the water-absorbing member is composed of a three-layered structure.

However, Sakakibara does teach that the water-absorbing member [13] includes a member absorbing the water by utilizing capillary phenomenon (p. 6, para. 2). Further, Chizawa teaches a fuel cell system that using a temperature/humidity exchange portion 10, with a water retentive porous body 14, is disposed to contact a fuel cell stack 9, as shown in Figs. 2A, 2B (8:29-31, 8:49-55, 9:8-15). The porous water retentive porous body 14, which is required to be able to hold water and allow this water to evaporate upon a change of osmotic pressure, can be formed of a composite film composed of a fluorinated porous film laminated with a fibrous polymer material (9:5-15). The porous body is attached to a grooved, carbon separator plate through a sealing material 8 (8:56-65; Figs. 2A, 3A).

Art Unit: 1795

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a water-absorbing member with a three-layered structure, as described by Chizawa, in the power generation apparatus of Sakakibara, where a first layer having a water-absorbing/releasing property bonded to a second layer having a water absorbing property (via a capillary phenomenon) which is further bonded to an bonding material, because the skilled artisan would appreciate that the this use of this structure further controls the composition of the water absorbing member in efforts to ensure that absorbed water from fuel cell operations is effectively moved out of the cell.

As to the use of a tape material, Chizawa teaches that its porous water retentive porous body is attached to a grooved, carbon separator plate through a sealing material, as discussed above. Thus, it would have been obvious to one of ordinary skill in the are to bond a tape material to the lower surface of the second material used in the water-absorbing member employed in the power generation apparatus of Sakakibara, as modified by Chizawa, because use of a tape to bond (and seal) components of a fuel cell to one another is well-known in the art.

Regarding claim 80, Sakakibara teaches that the water-absorbing member [13] is further provided along at least a partial region of a sidewall [B] of the oxidizer supply groove [11] (Fig. 1(B); p. 7, para. 5 – p. 8, para. 1).

Regarding claim 81, Sakakibara teaches that the water-absorbing member [13] is provided so as to cover at least a part of the surface having the oxidizer supply groove formed therein (Figs. 1(B), 2(A), 2(B); p. 7, para. 5 – p. 8, para. 1).

Regarding claim 84, Sakakibara teaches that the water-absorbing member [13] is an aggregate of string-formed fiber having a void portion formed therein in a longitudinal direction (p. 8, para. 2).

Regarding claim 88, Sakakibara teaches that the water-absorbing member includes the oxidizer supply groove having a high water-repellent region formed therein (p. 4, para. 2).

Art Unit: 1795

Regarding claim 89, Sakakibara teaches that the water-absorbing member includes the oxidizer supply groove having a high hydrophilic region formed therein (p. 6, para. 2).

Regarding claim 90, although Sakakibara teaches that its fuel cell includes an air electrode, as discussed above, the reference does not expressly teach that the fuel gas includes a hydrogen gas. However, Chizawa teaches that a fuel cells system is designed such that a fuel gas such as hydrogen or a reactive gas is rendered to electrochemically react with an oxidizing gas such as air so as to directly convert the chemical energy of the fuel to an electric energy (1:20-23). Thus, it would have been obvious to one of ordinary skill in the art at time of the invention to use hydrogen as fuel for the power generation apparatus of Sakakibara, as modified by Chizawa, because it is known in the art as molecule which easily ionizes into protons to releases electrons.

Regarding claim 91, Sakakibara teaches that a power generation section having a stacked structure in which a plurality of elements holding the power generator by the separator is stacked (Figs. 2(A), 2(B); p. 9, para. 5).

Regarding claim 92, Sakakibara teaches a water-absorbing layer having at least water absorbency, air permeability and electro-conductivity and a current collector (p. 7, para. 4; p. 8, para. 2-3). One of ordinary skill would appreciate that the carbon black which can be included in the water-absorbing layer of Sakakibara is electroconductive.

8. Claim 82 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakakibara et al. and Chizawa et al. as applied to claims 78, 80, 81, 84 and 88-92 above, and further in view of Wilson et al. (US 5,595,834).

Sakakibara and Chizawa applied and incorporated herein for the reasons above.

Regarding claim 82, Sakakibara and Chizawa do not expressly teach that the separator has a radiating fin for dissipating heat of the power generator; or, that the water-absorbing member includes a

Art Unit: 1795

region extended from a surface of the radiating fin of the separator and another region that covers at least part of the oxidizer supply groove.

Wilson teaches a fuel cell stack with separator plates 34 that may extend radially from above the periphery of the stack to serve the additional function of a cooling fin (Title; 2:40-57; 4:21-23; Fig. 1). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to include a radiating fin in the separator used in the power generation apparatus of Sakakibara, as modified by Chizawa, because Wilson teaches that the radiating fin can be employed to cool the cell.

As to the water-absorbing member including a region extended from a surface of the radiating fin of the separator and another region that covers at least part of the oxidizer supply groove, one of ordinary skill in that art would appreciate that the water absorbing member used in the power generation apparatus of Sakakibara, as modified by Chizawa and Wilson, which covers part of the oxidizer groove (as discussed above with respect to claims 78 and 81), makes contact with the fins of its separator at the ends of the separator.

9. Claim 87 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakakibara et al. and Chizawa et al. as applied to claims 78, 80, 81, 82, 84 and 88-92 above, and further in view of Nishida et al. (US 6,660,419).

Sakakibara and Chizawa are applied and incorporated herein for the reasons below.

Regarding claim 87, Sakakibara and Chizawa do not expressly teach that the oxidizer supply groove has a roughened surface.

Nishida teaches the performance of a fuel cell can be improved by roughening the surface of separator grooves for gas flow because contact resistance is reduced (14:24-41).

It would have been obvious to one of ordinary skill in the art at the time of the invention to roughen the surface of the oxidizer supply groove in the power generating apparatus of Sakakibara, as

Art Unit: 1795

modified by Chizawa, because Nishida teaches this roughening can improve the performance of the apparatus.

Response to Arguments

10. It is noted that portions of the specification cited by applicant (other than references to figures) do not appear to correlate with the page and line numbers presented in the amended specification filed on October 1, 2004. The examiner has attempted to locate portions of the specification now pending in the instant application that correspond to amendments presented by applicant.

11. Applicant's arguments filed December 18, 2009 have been fully considered but they are not persuasive. In sum, applicant makes the following arguments:

(a) "Applicants respectfully submit that the Specification provides full support for the presently claimed limitation that the surface area of the water-absorbing member is larger than the surface area of the power generator. ... See, Specification, page 8, paragraph 106; Fig. 2. Applicants respectfully submit that this portion of the Specification clearly indicates that the water-absorbing member has a larger surface area than the large-area power generation apparatus, since the only area described in that sentence which the surface of the water-absorbing could be larger than is that of the power generation apparatus. Thus, ... the Specification provides full support for each and every limitation of Claims 47-51, 53-55 and 58-60. ..." (see p. 11-12);

(b) "...Applicants respectfully submit that the combination of *Sakakibara*, *Strekert* and *Chizawa* fails to disclose every element of currently amended Claim 78. ... Although Chizawa teaches that the porous body "is capable of holding water condensed from water vapor included in the reactant gas., and then enabled to evaporate [the water] due to a difference in partial pressure of water vapor," nowhere does Chizawa teach or even suggest that its porous body includes a first material having a water-absorbing/releasing property and a second material having a water-absorbing property. ... Chizawa fails to disclose or suggest a tape material that is bonded on the lower side of the second material. ..." (see p. 12-14)

12. As to applicant's argument (a) above, applicant is directed to the rejection of these claims as presented in Paragraph 4 above. Further, as to applicant's contention that "...this portion of the Specification clearly indicates that the water-absorbing member has a larger surface area than the large-

Art Unit: 1795

area power generation apparatus, since the only area described in that sentence which the surface of the water-absorbing could be larger than is that of the power generation apparatus. ...”, it is noted that there is discussion in the specification regarding the area of the water-absorbing member prior to the portion cited by applicant. In light of discussion leading up to, and including, the portion of the specification cited by applicant, one of ordinary skill in the art would readily appreciate that the specification appears to describe increasing the surface of the water-absorbing member to accommodate use in a "large-area" power generation apparatus. That skilled artisan would also appreciate that the specification does not state, show, or compare, the "larger surface area" of the water-absorbing member to that of the power generation apparatus.

13. As to applicant's argument (b), one of ordinary skill in the art would readily appreciate that, in order for the layers forming the composite film used in the porous water retentive porous body described in the Chizawa reference to have the characteristics of holding water and enabling evaporation: (i) either one layer holds water and the other layer enables evaporation; or, (ii) one layer has both characteristics and one layer has either one of the properties; or, (iii) both layers have both of these properties. (Also, it should be noted that it is prima facie obvious to combine two compositions, each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the same purpose. *In re Kerkhoven*, 205 USPQ 1069, 1072. See MPEP 2144.06 (I).)

Further, as the Chizawa reference failing to disclose or suggest a tape material that is bonded on the lower side of the second material, it should be noted the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the *combined* teachings of the references would have suggested to those of ordinary skill in the art [emphasis added]. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Art Unit: 1795

14. As to the remainder of applicant's arguments, they have been considered but applicant has amended the claims such that new grounds of rejection were necessitated.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Edu E. Enin-Okut** whose telephone number is **571-270-3075**. The examiner can normally be reached on Monday to Thursday, 7 a.m. - 3 p.m. (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dai-Weh Yuan can be reached on 571-272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1795

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